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ABSTRACT

The California Critical Thinking Skills Test--College Level (CCTST) was examined in terms of the possible impact on critical thinking (CT) skill performance of: (1) student gender; (2) ethnicity; (3) academic major; and (4) CT self-esteem. The CCTST was administered to 1,196 students at California State University (Fullerton) in the 1989-90 school year, with pretest data from the February administration, and posttest data from administrations at the ends of semesters in November 1989 and May 1990. Data were gathered from four courses satisfying a college requirement in critical thinking and a control group course. The analysis of pretest and control data indicated that the CCTST was not gender biased. The analysis of covariance indicated that the CCTST does not favor or place at a disadvantage any particular ethnic or racial group. Student CT self-confidence did correlate to relative success on the CCTST. Posttest data did indicate significant differences by gender, ethnicity, and academic major, indicating a need for additional research on the differential impact of college CT courses on skill acquisition. (SLD)

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The California Critical Thinking Skills Test – College Level

Technical Report #3

Gender, Ethnicity, Major, CT Self-Esteem, and the CCTST

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The California Critical Thinking Skills Test: College Level

Technical Report #3 --

Gender, Ethnicity, Major, CT Self-Esteem and the CCTST

by

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Abstract

Technical Report #3 examines the California Critical Thinking Skills Test: College Level (CCTST) in terms of the possible impact of student gender, ethnicity, academic major and CT self-esteem on CT skill performance. Analyses of pretest data and control group data show that the CCTST is not gender-biased. Statistically significant gender differences emerge only after students complete their college level CT course. ANCOVA also indicates that the CCTST does not favor or disadvantage any particular ethnic or racial group. However, not all groups appear to benefit equally from having completed a college level CT course. While academic major was not a significant factor on the CCTST pretest, scores on the posttest did vary significantly by major. Student CT self-confidence, which appears unrealistically high, does correlate with relative success on the CCTST. However, when SAT and native language are controlled, CT self-confidence is not a significant factor in explaining pretest or posttest results. The emergence of significant differences by gender, ethnicity and major on the CT posttests indicates an urgent need for research on student learning relative to CT curriculum and CT pedagogy. To more effectively and more equitably serve diverse groups of students, the sources of the differential impact of college level CT courses on CT skill acquisition must be discovered and remedied. Technical Report #1 reports on the content validity of the CCTST and its experimental validation. Technical Report #2 describes its concurrent validity and its correlations with SAT-verbal, SAT-math, college GPA, and Nelson-Denny Reading Test scores. Technical Report #4 provides group norms and discusses CCTST sub-scores on analysis, evaluation, inference, deductive reasoning and inductive reasoning skills.

The California Critical Thinking Skills Test: College Level

Technical Report #3 --

Gender, Ethnicity, Major, CT Self-Esteem and the CCTST

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Recap of Previous Findings

This Technical Report examines the California Critical Thinking Skills Test: College Level (CCTST) in terms of possible inherent biases with regard to student gender and ethnicity. It also explores the relationships between the CCTST and students' academic majors and their self-reported CT self-esteem, (Facione, 1990 e). Technical Report #1 discussed the content validity of the CCTST in terms of the conceptualization of CT expressed in Critical Thinking: A Statement of Expert Consensus for Purposes of Educational Assessment and Instruction as well as the concept of CT grounding the system-wide CT general studies requirement of the California State University, (Facione, 1990 a). Also, Technical Report #1 described a series of four experiments which indicated that the CCTST

is an effective measure of the improvements in the core CT skills of interpretation, analysis, evaluation, inference and explanation which occur as a result of taking a lower division college level CT course. During 1989/90, data was collected on a variety of variables relating to the 20 instructors and the 1196 college students who participated in these experiments. Those studied were either teaching or enrolled in 45 sections of five different courses offered by three departments, (Facione, 1990 c).

Technical Report #2 described the relationship of CCTST results to a number of student-related and instructor-related variables. Critical thinking skills, as measured on the CCTST, can be predicted by a combination of SAT verbal, SAT math, and GPA data with R-square =.41 If CCTST pretest data are included in the regression model the R-square =.71. A college student's age, units of college work completed, and high school preparation, and an instructor's teaching experience do not contribute significantly to the regression models which predict CCTST posttest results. CCTST results positively correlated with Nelson-Denny reading scores for vocabulary, comprehension, and total score. Non-native English speakers show virtually no gain from CCTST pretest to posttest. Of six instructor-related factors which are thought to be related to effectiveness in teaching CT skills, only years of teaching experience and recent experience teaching CT are related, and these in non-linear ways. No evidence was found to support the hypothesis that CT skill development is a natural outcome of baccalaureate education, either in general, or by reference to the control groups, (Facione, 1990 d).

Differences by Gender

At California State University, Fullerton during the 1989/90 academic year the CCTST was administered to 1196 students. The November 1989 and May 1990 administrations, coming at the ends of the Fall Semester and Spring Semester respectively, yielded posttest data. The February 1990 administration produced pretest data. These data were gathered in four courses approved as satisfying the campus general studies requirement in critical thinking and one control group course. If the CCTST were a gender-biased instrument, one would predict a statistically significant difference between the mean score for women and the mean score for men on the Feb. 1990 pretest. That is, assuming women and men enter their college CT course with the same initial levels of CT skills, the CCTST used as a pretest should detect no statistically significant difference between the mean scores of women and men.

T-tests were conducted on the mean scores for women and men on the Feb. 1990 CCTST pretest results. The mean score for 237 men enrolled in CT courses was 16.287 with a standard deviation of 5.083. The mean score for 242 women enrolled in these same courses was 15.901 with a standard deviation of 4.204. The resulting t-statistic is 0.90. With 457.18 degrees of freedom the two-tailed probability for the separate variance estimate is p=.366. The null hypothesis is retained. There was no statistically significant difference between

the mean scores of men and of women on the CCTST pretest. This finding supports the inference that the CCTST is not a gender-biased assessment tool. Analyses of the control group CCTST scores further confirm this finding. Since there was no significant difference between pretest and posttest scores for the control groups, the analysis of possible gender differences was made by combining all control group Nov., Feb. and May scores. The mean for 115 control group men was 15.930 with a standard deviation of 4.505 and the mean for 97 control group women was 15.237 with a standard deviation of 3.596. The resulting t-statistic is 1.25, which, with 209.40 d.f. on the separate variance estimate yields a two-tailed probability of p=.214 -- not statistically significant.

Given these findings, we might assume that men and women come to their CT course with comparable CT skills. Do approved college level CT courses has differential impacts by gender on CT skill acquisition? One would hope not. And the posttest data from the Nov. 1989 administration suggests not. On the Nov. posttest the mean for 201 men was 17.199 and the mean for 248 women was 16.601. With 426.19 degrees of freedom the separate variance estimate two-tailed probability p=.178. However, the May 1990 posttest produced an unexpected and disturbing finding. On the May posttest the mean score for men was 18.008 and the mean score for women was 16.799. The resulting t-statistic of 2.14 turned out to be statistically significant (p=.033) with 256.6 degrees of freedom. When the results of the Nov. 1989 and the May 1990 CT posttest administrations were combined, the null hypothesis was again rejected. Combining the

posttest scores for all CT students, the mean for 382 women was 16.670 and the mean for 328 men was 17.515. These data yield a t-statistic of 2.42 which is statistically significant a p=.016 with 683.94 degrees of freedom. **Although they enter roughly equal, women and men emerge from a CT course with different levels of CT skills.**

The students in this representative study come to the university and to their CT course with significantly different academic backgrounds. Specifically they differed significantly by gender in SAT-verbal, SAT-math, and college GPA. Since the regression model which includes these three factors explains over 41% of the variance in CCTST posttest scores, perhaps this would explain the differential outcomes by gender. Although students may come to the CT course with roughly comparable CT skills, perhaps they benefit differently because of the differences by gender in scholastic aptitudes or levels of academic achievement as measured by the SAT instruments and college GPA.

Table 1

Differences by Gender

	Men	Women	Difference	Prob.	n-Males	n-Women
Prep-Eng	7.65	7.79	-.68	p=.094	272	311
Prep-math	6.53	6.29	.52	p=.091	273	312
SAT-verb	428	408	-108	*p=.009	288	320
SAT-math	514	459	-18	*p=.001	288	320
ELM	52.2	51.8	.4	p=.676	151	255
EPT	147.2	147.5	.3	p=.746	200	235
GPA (college)	2.64	2.75	.11	*p=.004	414	263
Feb. Pretest	16.3	15.9	-.4	p=.366	237	242
Nov. Posttest	17.2	16.6	-.6	p=.177	201	248
May Posttest	18.0	16.8	-1.2	*p=.033	128	134
Nov + May Post	17.5	16.7	-.8	*p=.016	328	382
Control Group	15.9	15.2	-.7	p=.214	115	97

At the time of the Feb. pretest and among the control group

there was no statistically significant difference between the CT skills of men and women. But gender differences were evident by the time of the May posttest and they are also evident when the Nov. 1989 and May 1990 posttest data were combined. There are two ways the emergence of these differences might be accounted for. The first way is to suggest that the gender differences apparent on the posttest can be attributed to or predicted by the differences in other factors. There is solid evidence to support this. ANCOVA controlling for SAT-verbal and SAT-math scores revealed that gender was not a significant factor in predicting combined Nov. and May posttest variance. ($F=.848$; d.f. 1, 464; $p=.358$). Using ANCOVA the gender difference evident in the May 1990 posttest data also is rendered less than statistically significant if SAT and GPA differences are controlled ($F=.163$; d.f. 1, 188; $p=.687$).[1] This way of accounting for the posttest gender difference suggests that there is something about the scholastic aptitudes that women and men bring to the CT instructional setting which differentially advantage men over women in that setting.

On the other hand, perhaps college grading practices and the SAT instrument are gender-biased and men and women do not really bring significantly different aptitudes to the instructional setting. In that case, other factors would have to be examined to explain the gender differences which emerge on the CT posttest. It might be that men and women have differing expectations for success in a CT course. Perhaps there are differential impacts by gender of the kinds of curricular materials or pedagogical methods typically used in

college level CT courses. Or, it may be that the ways in which women and men learn CT differ and that these differences have yet to be understood and accounted for by those of us who teach CT at the college level.

The pretest findings, the control group findings, and the ANCOVA results are sufficient to assuage concerns about the possible gender-bias of the CCTST. However, that a significant gender difference is evident in the combined posttest data suggests that women and men are not acquiring CT skills with equal success in their college level CT courses. Although beyond the scope of the present research, why this happens deserves investigation.

Differences by Ethnicity and Race

In their applications for admission to the California State University students are invited to self-identify as to ethnicity and race. The distributions for students in the fall semester and spring semester experimental groups are displayed on Table 2. Using these data as a starting point, students were clustered into six ethnic/racial groups and into self-identified native and non-native English speakers. Table 3 indicates the numbers in each group. Although not altogether arbitrary, this process raises a number of serious sociological, ethnographic, and biological questions.[2] And, concern for the highly suspect nature of categorizing North Americans by ethnicity or race should dampen any enthusiasm one might have for

examining data grouped by such notoriously unreliable variables.

Table 2

Student Ethnicity and Race Self-Identification

CSU Label	Value	Frequency	Percent	Valid Percent	Cum Percent
American Indian/Native Am.	1	1	.1	.1	.1
Black/Non-Hispanic	2	25	2.6	2.9	3.0
Chicano/Mexican American	3	73	7.7	8.5	11.5
Central American	4	2	.2	.2	11.8
South American	5	7	.7	.8	12.6
Other Hispanic	6	18	1.9	2.1	14.7
Chinese	7	6	.6	.7	15.4
Japanese	8	8	.8	.9	16.3
Korean	9	4	.4	.5	16.8
Southeast Asian	10	8	.8	.9	17.7
Other Asian	11	124	13.1	14.4	32.1
Pacific Islander	12	6	.6	.7	32.8
White/Non-Hispanic	13	533	56.4	62.0	94.9
Filipino	14	15	1.6	1.7	96.6
Other	15	17	1.8	2.0	98.6
Declines to State	17	12	1.3	1.4	100.0
No Response/Missing	16	86	9.1	MISSING	
	TOTAL	945	100.0	100.0	

Table 3

Re-Groupings by Ethnicity and English Language

	Total	Native English	Non-native English
American Indian	1	1	0
Asian	124	41	83
Black	24	24	0
Hispanic	99	70	29
White	550	526	24
Foreign	42	9	33
Valid Cases	840	671	169

If the CCTST contains an inherent bias for or against a given ethnic/racial group, then we might predict that CCTST pretest scores would differ significantly on the "ethnicity/race" variable. Given the finding in Technical Report #2 -- that native English language is a statistically significant factor -- examination of the possible impact

of ethnicity/race was restricted to self-identified native English language speakers. As Table 4 indicates, thus restricted, a student's ethnicity/race initially appears to be a statistically significant factor not only on the CCTST pretest but on nearly every index of academic preparation, achievement, and assessment for which data was collected.

Table 4

Differences by Ethnicity/Race of Native English Speakers

	Am. Ind	Asian	Black	Hispanic	White	Foreign	n	Prob.
Prep-Eng	n/a	7.96	7.22	7.87	7.88	8.00	444	*p=.001
Prep-math	n/a	6.59	4.90	6.37	6.31	7.20	445	p=.071
SAT-verb	n/a	409	345	421	443	456	474	*p=.003
SAT-math	n/a	480	353	454	498	536	474	*p<.000
ELM	n/a	55.7	37.2	49.2	51.9	52.0	304	*p<.000
EPT	n/a	148.4	140.7	149.7	151.2	149.7	307	*p<.003
GPA	2.83	2.75	2.35	2.54	2.74	2.52	671	*p=.003
Feb. Pre	n/a	16.8	13.0	15.8	16.8	17.6	389	*p=.013
Both Posts	15.0	16.7	15.1	16.0	18.1	19.6	502	*p=.002

Table 4 indicates that among native English speakers, blacks (n=13) and foreign students (n=7) registered the largest gains, two points, from pretest to posttest. On average whites (n=395) gained 1.3. The experience of completing an approved college level CT course was not as positive for native English speaking Asians and Hispanics.

Table 4 reveals statistically significant differences on three factors identified in the regression model developed in Technical Report #2 as predictors of CCTST results. There is a 111 point range in SAT-verbal scores, a 186 point range in SAT-math scores, and range of .48 on college GPA. This strongly suggests that controlling for native language alone is not sufficient to isolate the possible impact of ethnicity/race on CCTST pretest scores. However, ANCOVA controlling for SAT scores, GPA and native language indicates that

ethnicity/race is not a significant factor. ANCOVA were run on CCTST pretest scores, November posttest scores and combined Nov. and May posttest scores. Both the derived variable "ethnicity/race" and the CSU system ethnic code indicator were used as independent variables. In no case was either significant when SAT scores, GPA, and native English language ability were controlled factors. Table 5 indicates the results of these six ANCOVA.

Table 5

Non-Significance of Ethnicity/Race or CSU Ethnic Code

		Feb. Pretest		Nov. Post		Nov.+ May Post	
Source of Variation	DF	F	Sig.	F	Sig.	F	Sig.
SAT-Verbal	1	51.769	.000	65.130	.000	94.612	.000
SAT-Math	1	25.201	.000	36.268	.000	56.411	.000
GPA	1	1.394	.239	1.455	.229	5.332	.021
English	1	2.592	.108	30.286	.099	6.731	.010
Main Effects							
Ethnicity/Race	4	.404	.806	.543	.704	.381	.822
Explained	8	22.831	.000	30.805	.000	46.428	.000
Residual	309						

Source of Variation	DF	F	Sig.	F	Sig.	F	Sig.
SAT-Verbal	1	51.201	.000	62.922	.000	92.051	.000
SAT-Math	1	24.925	.000	34.028	.000	54.663	.000
GPA	1	1.379	.241	1.301	.255	5.160	.024
English	1	2.563	.110	3.301	.070	7.417	.007
Main Effects							
CSU Ethnic Code	11	.474	.919	1.223	.272	.955	.488
Explained	15	12.284	.000	16.795	.000	25.039	.000
Residual	302						

The findings reported in Table 5 indicate that the CCTST appears not to contain inherent biases in favor of nor opposed to any ethnic or racial group. The pretest and posttest results are predicted by student's SAT scores, GPA and native language, but not by their race or their ethnicity. Whereas blacks and whites apparently benefit from their CT course, native English speaking Asians and Hispanics show no CT skill improvement. As with the

gender issue, these findings, if replicated, raise serious questions regarding our CT pedagogy and our CT curricular strategies.

Differences by Academic Discipline Grouping

How do students from different college disciplines do on the CCTST? Presented with the prompt "The major in which I hope to graduate can best be grouped with..." students were given six clusterings of majors from which to select one. The six were formed on the basis of the epistemological and methodological similarities and differences hypothesized by this researcher to obtain among the disciplines in each cluster. Table 6 indicates the Feb. pretest and combined posttest results for each of the six. Fortunately every group appears to benefit from CT instruction. However the benefits do not appear to be equally divided. Indeed, analysis of variance of the posttest results indicate that academic major (as here clustered) is a statistically significant factor with regard to CCTST performance, ($F=5.2253$; d.f. 6, 719; $p=.0000$).

However, academic major was not statistically significant with regard to the CCTST pretest, ($F=1.4661$; d.f. 5, 468; $p=.1995$). As with earlier findings, this suggests that the significant CCTST differences among the students from different majors which emerged on the posttests may well have come about because of curricular or pedagogical differences among the particular CT courses they completed.

Table 6

CCTST Differences by Grouped Academic Majors

Group and % of Cases	Feb. '90 Pretest	Nov. '89 + May '90 Posttest	Delta
A. Letters, languages, English, Liberal Studies, History, Humanities. [18%]	17.18	18.50	+ 1.32
B. Social Sciences, Psychology, Human Services, Teaching. [20%]	15.82	16.93	+ 1.11
C. Mathematics, Engineering, Statistics, Computer Sci. [9%]	16.14	18.18	+ 2.04
D. Natural Sciences, Physical Sci., Health Professions. [7%]	16.77	16.86	+ .09
E. Business, Administration, Management, Government, Military Science. [39%]	15.80	16.43	+ .63
F. Performance Studies, Drama, Art, Music, Physical Ed. [6%]	15.47	16.19	+ .62
Z. Omit -- No response [<1%]			

Table 7

SAT, GPA, Native Language and Age by Major

Group	SAT-Verb	SAT-Math	GPA	% Nat-Eng	Age
A. Letters, languages, English, Liberal Studies, History, Humanities.	468	469	2.82	94%	23.05
B. Social Sciences, Psychology, Human Services, Teaching.	418	462	2.68	90%	22.26
C. Mathematics, Engineering, Statistics, Computer Science.	381	545	2.68	58%	24.25
D. Natural Sciences, Physical Sciences, Health Professions.	415	511	2.71	75%	22.62
E. Business, Administration, Management, Government, Military Science.	403	496	2.65	75%	21.74
F. Performance Studies, Drama, Art, Music, Physical Education.	415	457	2.69	85%	22.92
Z. Omit -- No Response	358	398	3.05	89%	21.89
Mean	417	485	2.70	81%	22.44
Standard Deviation	95.3	97.1	.59		5.05
Total Cases	608	608	877	941	940
ANOVA F-statistic	7.5956	6.3058	2.0609	11.9627	3.5083
Degrees of freedom	6, 601	6, 601	6, 870	6, 934	6, 933
Sig. of F	p<.0000	p<.0000	p=.0555	p<.0000	p=.0019
Eta Squared	.07	.06		.07	.02

Research on hypotheses regarding the predisposition of different groups of majors to benefit differentially from various approaches CT instruction is welcome. More remarkable for baccalaureate education are the differences by SAT scores, native language, and age reported on Table 7. On these four factors statistically significant differences were found. Oddly though, the differences among the various groupings of majors did not quite reach the level of statistical significance on the variable GPA.

Objective Findings and Students' Self-Perceptions

The strong positive correlation of CCTST with college GPA, reported in Technical Report #2, does not match the students' perceptions. When the Feb. 1990 pretest group was asked to respond to the statement: "My GPA is an accurate reflection of how logical my thinking is," 224 students (47%) indicated "No, not really," and 170 (35) said "More yes than no." Only 49 (10%) said "Yes it is," whereas 34 (7%), indicated "No, they do not match at all." These misgivings about the relationship between their GPA and their CT ability might be attributable to uncertainty on the part of pretest students regarding what CT was. One might expect, therefore, that after having completed an approved CT course, their perceptions about the relationship between their GPA and their CT ability might have changed. But they did not. Given the same prompt, on the Nov '89 posttest, 42% (196 of 465) said "No, they do not match," 35% (161) answered "More yes than no," 14% (65) said "Yes it is," and 9% (41) responded "No, they do not match at all." It is not clear to this

investigator why students perceive their GPA and their CT abilities not to be strongly correlated when in fact they are. It may have something to do with their views about CT, or it may be that they are generally skeptical about the GPA. But, as indicated below, it is not for want of self-confidence about their CT ability that students responded in this way.

To explore their CT self-confidence, students were asked to respond to the prompt, "Critical thinking and being logical are quite easy for me." Of the 480 Feb. pretest students 383 (80%) gave positive responses and only 96 gave a negative response. On the Nov. 1989 posttest 392 (84%) gave positive replies and only 72 of 465 were negative. This level of CT self-confidence at posttest time seems particularly surprising, if not entirely unjustified, considering that the 16.83 posttest mean represents only 49.5% correct out of 34 items. Given what might be described as the "CT over-confidence" of these students, questions must be raised about the basis for these self-assessments. What have we educators done to promote in college students the notion that they should feel good about having a set of cognitive skills which, when exercised, yield the correct outcomes only about half the time?

As with the academic major groupings, the relationships between CT self-confidence and other variables, such as SAT, GPA, native language and age are also interesting. Table 8 displays the data. Although students' self-assessments were overly flattering, their positioning of themselves relative to their actual CT skills was

surprisingly accurate. As Table 9 reveals, statistically significant differences ($p<.000$) exist when comparing the CCTST exam scores of students with differing levels of CT self-confidence.

Table 8

SAT, GPA, Native Language and Age by CT Self-Confidence

Responses and % of Cases	SAT-Verb	SAT-Math	GPA	% Nat-Eng	Age
A. Yes, to be honest I do. [27%]	448	523	2.77	86%	22.92
B. Well, I sort of agree. [55%]	415	480	2.68	81%	21.95
C. No, not really. [16%]	386	446	2.66	74%	23.20
D. Are you kidding. [2%]	320	378	2.63	73%	23.07
Mean	417	485	2.70	81%	22.44
Standard Deviation	95.3	97.1	.59		5.05
Total Cases	608	608	877	941	940
ANOVA F-statistic	10.7385	15.6005	1.2263	3.7384	2.8565
Degrees of freedom	4, 603	4, 603	4, 872	4, 936	4, 935
Sig. of F	p<.0000	p<.0000	p=.2263	p<.0050	p=.0227
Eta Squared	.07	.09		.02	.01

Table 9

CT Self-Confidence and CCTST Scores

Response	N	Pre-Mean	N	Nov. Post	N	May Post
A. Yes, to be honest it is.	107	17.41	149	18.83	60	19.65
B. Well, I sort of agree.	276	16.36	243	16.63	148	16.80
C. No, not really.	86	14.21	67	14.93	48	16.46
D. Are you kidding.	10	11.40	5	14.40	6	16.67

Given the value of positive self-esteem as leading to success in general, one might suppose that CT self-confidence should be a factor of some importance in predicting CCTST results. However ANCOVA controlling for SAT scores and native English language indicates that CT self-confidence is not of significance with regard to explaining either the CCTST pretest or CCTST posttest scores. Table 10 displays these findings.

Table 10

Non-Significance of CT Self-Confidence on CCTST Pretest

Source of Variation	Feb. Pretest DF	F	Sig.	Nov.+ May Post DF	F	Sig.
SAT-Verbal	1	61.039	.000	1	103.287	.000
SAT-Math	1	31.290	.000	1	69.300	.000
English	1	2.729	.100	1	6.047	.014
Main Effects						
CT self-confidence	1	1.215	.271	1	.248	.619
Explained	4	47.583	.000	4	89.527	.000
Residual	331			461		

Conclusion

As was the case with gender, ethnicity/race, and academic major, the CCTST passes muster with regard to CT self-confidence. That is, although important when considered in isolation from everything else, none of these factors is statistically significant when one controls for the impact on the CCTST of SAT scores, college GPA, and native English language on student performance. Based on these findings one can **assert with confidence that the CCTST does not differentiate unfairly among women and men, nor among people based on their ethnic/racial backgrounds, nor among students based on their academic majors or level of CT self-confidence.** The data with regard to these factors do, however, raise a number of urgent and interesting questions for future research and for CT instruction at the college level and for baccalaureate education in general.

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Notes

[1] This ANCOVA controlled for SAT-verbal, SAT-math, and college GPA. The first two covariates were significant at $p<.000$. The College GPA covariate had a probability of $p=.067$.

[2] CSU code 1 = American Indian; codes 7, 8, 9, 10, and 11 = Asian; code 3 = Black; codes 3, 4, 5, 6 = Hispanic; codes 12, 13, and 14 = White; code 15 = Foreign; codes 16 and 17 were omitted from further these analyses.